

Memo

To: Members of the House Education Committee
From: Erik Burke
CC: Senator Don Ryan, State Superintendent Linda McCulloch
Date: March 13, 2007
Re: Center for Evaluation and Education Policy Study of Full-Time Kindergarten

During the hearing on SB 152 last night (March 12, 2007), an opponent of the bill made reference to an Indiana study related to full-time kindergarten. Quoting one conclusion of the study's summary, the individual claimed that the study simply suggested that "there are no negative outcomes" resulting from full-time kindergarten and that investment in full time kindergarten would not lead to any real improvements for students. Having read the study, it is my belief that the conclusion quoted was taken out of context and did not fully represent the results of the study cited. Furthermore, I believe the same study DOES provide a variety of information and evidence that supports the efficacy of full-time kindergarten.

Rather than ask you to take my word for it, I have printed copies of the study for you to review. Therefore, please find attached the complete text of *The Effects of Full Day Versus Half Day Kindergarten: Review and Analysis of National and Indiana Data* (CEEP, 2004). I hope you will find this information useful in your deliberations.

Thank you for your consideration of this information.

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Thank you for your consideration of this information.

- Public Schools ■ Higher Education
- State & County Employees
- Head Start ■ Health Care

**The Effects of Full Day Versus Half
Day Kindergarten:
Review and Analysis of National and
Indiana Data**

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January 9, 2004

Prepared for the Indiana Association of
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The Effects of Full Day Versus Half Day Kindergarten: Review and Analysis of National and Indiana Data

Executive Summary

The Indiana Association of Public School Superintendents recently contracted with the Center for Evaluation and Education Policy (formerly the Indiana Education Policy Center) to conduct a review of research on full day kindergarten. The goal of the report is to provide useful information to Indiana policymakers as they debate the merits of full versus half day programs.

This report sought to answer three questions: What does the national research say about the effectiveness of full day kindergarten? What does the Indiana data say about full day kindergarten? And how is time used within full day kindergarten programs? Finally, the report concludes with a series of recommendations regarding Indiana policy on full day kindergarten.

What Does the National Research Say About the Effectiveness of Full Day Kindergarten?

Center staff conducted an exhaustive review of the literature regarding the effects of full day kindergarten programs. Primary sources were acquired from the on-line databases ERIC and PsycInfo. Additionally, lead authors of full day kindergarten projects were contacted. Only those reports that directly compare the experiences of students participating in full versus half day programs were included in the review. Research on alternate day programs, in which students attend an entire day of kindergarten on alternating days, is not included due to the lack of evidence supporting the effectiveness of these programs. Evidence was gathered supporting the following areas: attendance; academic achievement, including grade retention and special education referral; social and behavioral effects; and effects on disadvantaged students.

On the issue of attendance, findings are inconclusive. The studies involving academic achievement, grade retention, special education referrals, and social and behavioral effects generally support the effectiveness of full day over half day programs. Disadvantaged students in full day kindergarten were also found to experience greater academic benefits than students in half day programs, although the magnitude of these greater benefits is again inconclusive. The national research suggests that there are no negative outcomes commonly associated with full day kindergarten.

What Does the Indiana Data Say About the Effectiveness of Full Day Kindergarten?

Researchers have conducted several evaluations of full day kindergarten in Indiana. These studies followed students in the following Indiana school districts: Evansville-

Vanderburgh School Corporation, Lawrence Township, Perry Township, Muncie Community Schools, and Indianapolis Public Schools. Each set of studies is reviewed in this section. Data were also collected from and analyzed from two additional Indiana districts: a large, urban district and a rural district.

Several criteria were used to identify research for this section of the report: First, data had to be available for full day kindergarten students *and* a control group of students (usually half day students in the same district or school). Second, full day programs needed to be every day programs, not full day–alternate day programs. Third, extended day programs could not be included unless substantive instruction occurred during the extended day part of the program (i.e., the program could not be half day kindergarten plus afternoon child care).

Results from the eight Indiana data sets reflect the results of the national research on full versus half day kindergarten. As was the case with the national data, the Indiana research suggests that there are no negative outcomes commonly associated with full day kindergarten, and that – at worst – full day kindergarten and half day kindergarten have similar effects. Significant results in support of the benefits of full day over half day kindergarten were found in many of the comparisons within these studies. When analyzed on the major dimensions of academic achievement, grade level retention, special education referrals, and social and behavioral effects, the benefits of full day kindergarten programs are apparent.

How is Time Used in Full Day Programs?

To many critics, full day programs have the potential to be nothing more than half day kindergarten with an extra half day of play time. We identified only two recent studies that provide detailed analyses of how time is spent in full and half day programs: one national study and one study of students in Wisconsin. Given this paucity of research, we conducted a two phase study of instructional activities in Indiana kindergarten classrooms: In phase one, we collected full and half day kindergarten schedules from Indiana schools and compared the scheduled activities. In phase two, we conducted several site visits to full day programs to establish the validity of submitted schedules.

The research literature and data collected for this report provide evidence that time in full day kindergarten programs is different both quantitatively and qualitatively from how time is used in half day programs. Across all of the schools in the Indiana sample, the proportion of instructional time is similar across program types, resulting in much greater instructional time in full day programs, representing approximately 40-50% more instruction in full day programs than half day programs. The Wisconsin study and the Indiana site visits suggest that in individual classrooms, the additional time leads to greater use of child-initiated activities. In the site visit schools, these activities were almost universally instructional in nature and did not involve play. The published research also provides convincing evidence that certain types of reading skills and grouping strategies are more prevalent in full day programs, including reading aloud, peer tutoring, and mixed-ability grouping. During the Indiana site visits, researchers saw evidence of these activities, but half day programs were not observed and therefore comparisons cannot be made across program types.

Table of Contents

Executive Summary	I
Introduction	1
Section I: Review of Research on Full Day Kindergarten Effects	3
Attendance	3
Academic Achievement	4
Grade Retention and Special Education Referrals	5
Social and Behavioral Effects	6
Disadvantaged Students	6
Summary	8
Section II: Data from Indiana Districts on Full Day Kindergarten Effects	9
Introduction	9
Evansville Study	9
Lawrence Township Study	15
Perry Township Report	16
Muncie Community Schools Study	17
Indianapolis Public Schools Study	18
Analysis of Data from a Large, Urban School District	20
Analysis of Data from a School in a Rural District	23
Summary	24
Section III: Analysis of Daily Activities in Full Versus Half Day Kindergarten Programs	25
Introduction	25
Published Studies on How Time is Spent in Full and Half Day Classrooms	25
Curriculum/Schedule Analysis	26
Site Visits	28
Summary	29
Conclusions and Recommendations	30
References	32
Appendix A: Summary of Select Kindergarten Policies for All 50 States	36

Introduction

School districts, both in Indiana and nationally, have begun to focus attention on the importance of early childhood education. These efforts are based on the belief that preparing all students to be “ready to learn” by first grade will help shrink the achievement gap between subgroups of students. A common strategy among these early childhood initiatives is to extend traditional half day kindergarten programs to full day programs.

A number of perceived benefits are associated with full day programs, including better preparation for elementary school, especially for students at risk; continuation of preschool programs, many of which involve full day experience; greater access to support services for students with special needs; simplified child care and transportation responsibilities for parents; and reduced midday transportation responsibilities for schools. At the same time, critics of full day programs suggest several limitations, including cost of these programs related to need for increased space and instructional staff; full day programs becoming a proxy for childcare; young children’s ability to adapt and cope with full day experiences; and uncertainty about the long-term benefits of such programs.

As Indiana policymakers debate the merits of full versus half day programs, a review of pertinent research will provide useful information. For this reason, the Indiana Association of Public School Superintendents contracted with the Indiana Education Policy Center to conduct a review of research on full day kindergarten. This report has three sections: In Section I, we review research conducted nationally and in other states on full day kindergarten. Section II reviews published and unpublished analyses of data from Indiana students; this section also contains data from three districts that were analyzed specifically for this report. Section III provides analysis of half and full day kindergarten curricula and schedules. Finally, the report concludes with a series of recommendations regarding state policy on kindergarten activities for the state of Indiana.

Participation in Full Day Kindergarten

State policies vary widely with respect to full day kindergarten (see Appendix A). As of the beginning of the 2003-2004 school year, 40 states required public school districts to offer

kindergarten programs, of which 10 required districts to offer full day programs.¹ However, participation in kindergarten is mandatory in only 14 states, with full day participation mandatory in only 2 of those states (Louisiana and West Virginia). Few states mandate that districts offer half day programs if full day programs are being offered.

According to the U.S. Department of Education's Early Childhood Longitudinal Survey (ECLS; Walston & West, 2002), enrollment in full day kindergarten also varies widely across states, communities, and schools. Nationwide, enrollment ranges from 83% in the southern states to 23% in the western states.² Demographic variables impacting enrollment in full day kindergarten include: location of the child's home, race, ethnicity, poverty, and type of school, i.e., public or private (Denton, West, & Walston, 2003; Walston & West, 2002). Students from rural and urban districts are more likely to attend full day kindergarten programs than their suburban counterparts. Ethnic groups participating in full day kindergarten are: African American (79%), white (49%), Hispanic (46%), Asian (40%). Attendance in full day kindergarten is greater for children of poverty level families (62%) than for children of families with non-poverty level status (51%). Students from non-English speaking homes attend full day programs at a lower rate than children from English speaking homes (45% vs. 55%). Of schools studied in ECLS, 70% of private institutions offer full day programs compared with 54% of public schools.

Currently, only 12% of Indiana kindergarten students attend full day programs (LAS, 1999). This low participation rate is primarily due to the very limited funding for full day kindergarten programs provided by the state (i.e., \$8.5 million for the 2003-2004 school year vs. roughly \$100 million estimated to be needed to offer universal full day kindergarten for the 2001 fiscal year; Goodpaster, 1999). However, several Indiana school districts have created these programs with a combination of local, Title I, and other state and federal funds. As a result, access to full day kindergarten has been uneven across the state. To date, a statewide evaluation of the funding mechanisms for and effectiveness of these programs has yet to be completed.

¹ Alabama, Arkansas, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, West Virginia (ECS, 2003)

² Northeast 41%, Midwest 45%

Section I: Review of Research on Full Day Kindergarten Effects

Indiana Education Policy Center (IEPC) staff conducted an exhaustive review of research literature regarding the effects of full day kindergarten programs. Primary sources were acquired from the on-line databases ERIC and PsycInfo. Additionally, lead authors of full day kindergarten projects were contacted. Only those reports that directly compare the experiences of students participating in full versus half day programs were included in the review. Research on alternate day programs, in which students attend an entire day of kindergarten on alternating days, is not included due to the lack of evidence supporting the effectiveness of these programs.³ Evidence was gathered supporting the following areas: attendance; academic achievement, including grade retention and special education referral; social and behavioral effects; and effects on disadvantaged students.

Attendance

Findings relative to kindergarten program type and attendance are mixed. Goodwin (1989) found greater daily attendance in full day kindergarten programs than in half day programs. However, in the Madison Metropolitan Study (1985) and a study by Humphrey (1980), no difference was reported, and Evans and Marken (1983) found that full day kindergarteners missed an average of 3.7 more days of school than students enrolled in half day programs. The mixed results are difficult to interpret: Full day students may need more absences for doctor's appointments and other necessary out-of-school activities, all of which may have occurred outside of kindergarten during half day programs. In addition, the sample of students probably has considerable influence on attendance results.

³ Research consistently favors every day full day kindergarten over alternate day full day kindergarten programs with respect to student achievement (e.g., Elicker, 2000; Pasco School District, 1987). Fusaro (1997) found that full day kindergarten was superior to both half day and alternate day programs, and half day kindergarten was better than alternate-day kindergarten regarding student achievement, while McConnel and Tesch (1986) found no significant differences between alternate and half day programs, which is not surprising given the two programs usually involve similar amounts of instructional time.

Academic Achievement

Academic achievement outcome data associated with full and half day kindergartens have been reported in three types of studies: meta-analyses; large, national-scale studies; and program evaluations of specific full and half day programs. Findings from meta-analysis and large-scale studies appear to support full day kindergarten with respect to short- and long-term academic achievement. For example, in a meta-analysis, McConnell and Tesch (1986) compared the findings from nine studies regarding full and half day kindergarten programs. These studies based their conclusions on analysis using 64 test instruments. The aggregated data reveal that 40 of the 64 comparisons (63%) favor full day kindergarten with respect to academic achievement gains with no comparisons favoring half day programs. Further, Fusaro's (1997) meta-analysis of achievement test results from 21 studies found a large effect size of .77 favoring full day kindergarten, explaining roughly 60% of the variance in the achievement test outcomes.

In an ongoing, national study performed as part of the Early Childhood Longitudinal Study conducted by the U.S. Department of Education's National Center for Education Statistics (NCES), NCES staff are following a nationally representative sample of children from kindergarten through the fifth grade, beginning with the kindergarten class of 1998-1999. Initial analyses of fall-spring assessment results from the kindergarten year found the reading gains of full day kindergarten students to be 0.12 standard deviations above those of students in half day programs after adjusting for external variables (Walston, West, & Rathbun, 2002). Results on the mathematics assessments suggest a similar benefit in favor of full day programs, again after adjusting for other child, family, and classroom characteristics.

The related literature with respect to small-scale research or program evaluations, in general, points to findings that support full day kindergarten as a contributing factor of greater academic achievement (e.g., Coladarci & Ervin, 2000; Cryan et al., 1992; Elicker & Mathur, 1997; Hills, 1985; Hough & Bryde, 1996; Koopmans, 1991; Lore, 1992). For example, according to an evaluation in Pasco School District 1 in Washington (1987), full day kindergarten students performed statistically significantly higher than half day students on nationally standardized tests measuring skills in reading, spelling, and handwriting, as well as on tests measuring individual skills (e.g., color, shape, numbers, letters, quantities). The full day kindergarten students also showed statistically significant mean gains on the English, mathematics, and handwriting subtests of these standardized achievement tests. Similar results

have been found in studies on other achievement outcomes, including prerequisite reading skills (da Costa & Bell, 2000) and oral language assessments (Wang & Johnstone, 1999). The benefits of full day programs appear to extend beyond the end of kindergarten, with evidence that full day students have higher academic achievement in third (Mueller, 1977) and eighth grades (Nieman & Gastright, 1981a; Pasco School District, 1987) in both reading and mathematics.

Within our review, some small-scale studies, however, did not find statistically significant differences in academic achievement based on kindergarten program type (Cryan et al., 1992; Holmes & McConnell, 1990; Johnson, 1974; McClinton & Topping, 1981; Stofflet, 1998). In one example, the scores of the Gates-MacGinitie Reading Test administered by Sergesketter and Gilman (1988) indicated no difference in reading achievement between kindergarten programs. Subsequent re-analysis however, suggests that full day kindergarteners did in fact have significantly higher scores (Fusaro, 1997). These results may be due to the small sample size of the studies which reduces the power of the significance tests, the lack of appropriate control groups, or the lack of pre-intervention data, all of which have been identified as weaknesses in early childhood research (Coladarci & Ervin, 2000; Fusaro, 1997; Puleo, 1988). When these threats to internal validity are addressed, small scale studies generally support full day relative to half day programs.

Grade Retention and Special Education Referrals

Grade retention and special education referrals are indirect indicators of student achievement, and the impact of full versus half day programs on these factors is addressed in several studies. Cryan et al. (1992) uncovered evidence that full day programs resulted in 17%-55% fewer grade retentions but found no relationship between program type and special education provisions. In a follow-up of the Anchorage School District full day kindergarten study, Stofflet (1998) found that first grade retention was less likely for students who had attended full day kindergarten. Other research has been mixed with regard to findings of change in retention rate or referral rate. In a longitudinal study, Evans and Marken (1983) found no relationship between kindergarten program type and "the number of children placed in categorical programs."

An eight-year longitudinal study conducted by Nieman and Gastright (1981a, 1981b) favors full day kindergarten. The researchers found that both special education referrals and

grade retention levels were greater with respect to students that had attended the half day kindergarten program. A summary of these results is presented in Table 1.

Table 1. Eighth grade follow-up on special education referrals and grade retention

	Full day	Half day
Special Education Referral	5%	11%
Grade Retention	9%	12%

Social and Behavioral Effects

Several research studies investigating pro-social and behavioral development favor full day over half day programs (Cryan et al., 1992; Humphrey, 1980; Wang & Johnstone, 1999). Cryan et al. (1992) investigated facets such as originality, individual learning, involvement in classroom activities, productivity with peers, intellectual dependency, failure, anxiety, withdrawal, blaming, and approach to teachers. They found that full day programs favored the development of these pro-social and behavior attributes with the exception of blaming. Full day programs have also been shown to foster greater independence (Puleo, 1988) as well as a greater degree of active engagement (Elicker & Mathur, 1997). In a study by Hoffman and Daniels (1986), data supported half day programs regarding personal and social development. No significantly different gains in maturity level were found in studies by Jones, Pollock, and Marockie (1988) or Puleo (1988).

A major concern related to full day kindergarten is whether young students can handle a full day of instructional activity. Opinions are mixed on this issue, but the research generally supports the conclusion that kindergarten students adjust to the longer days without major difficulties (e.g., Hough, 1996; Koopmans, 1991; McConnell & Tesch, 1986).

Disadvantaged Students

Several studies indicate that full day kindergarten has the greatest effect on at-risk children and children from educationally disadvantaged homes (Clark, 2001; Clark & Kirk, 2000; da Costa & Bell, 2000; Fusaro, 1997; Jones, Pollock, & Marockie, 1988; Karweit, 1992; Koopmans, 1991; Ohio State Legislative Office of Education Oversight, 1997; Pasco School

District 1, 1987; Puleo, 1988; Rothenberg, 1984). Students from low socioeconomic backgrounds also benefit considerably from full day programs (Jones, Pollock, & Marockie, 1988). Further, students at or below the poverty level enrolled in full day kindergarten scored statistically significantly higher in math and reading than their half day counterparts. Poor children enrolled in full day kindergarten programs tested statistically significantly above half day pupils on reading, spatial and verbal skills, naming colors and letters, and identifying numerals (Pasco School District 1, 1987). Out of all groups studied, students living at the poverty level who were enrolled in full day kindergarten programs also had the greatest improvement in English vocabulary.

Perhaps the most convincing evidence comes from a recent analysis of the Early Childhood Longitudinal Study by the U.S. Department of Education (Walston et al., 2002). As noted above, the ECLS data provide evidence that full day kindergarten programs are associated with greater reading achievement gains during the kindergarten year than half day programs. Similar benefits were observed when student race and poverty status were examined, although the results are complex. For example, full day versus half day differences are not consistent for children from households below the poverty threshold as compared to those from households at or above the poverty line. The larger gain in math scores for full day compared to half day kindergartners is more pronounced for children at or above the poverty threshold (8.7 vs. 7.3; effect size = 0.28) compared to children living in households below the poverty threshold (7.7 vs. 7.2; effect size = 0.10). Interestingly, the presence of an aide is associated with greater reading gains for Black children in full day kindergartens (9.5 mean gain with an aide vs. 7.7 mean gain without an aide; SD = 6.0, effect size = 0.30) and for Hispanic children in full day programs (11.6 with an aide vs. 10.1 without an aide; SD = 6.27, effect size = 0.24). For these minority children, gains associated with full day kindergarten and the presence of an aide are absent in the corresponding half day programs. However, this pattern is not observed for math performance. The authors conclude that "Providing full day kindergarten has long been considered an effective approach for improving minority reading achievement; this finding suggests that this approach, coupled with the presence of an instructional classroom aide, may improve the achievement of minority children in kindergarten" (Walston et al., 2002, p. 18).

Summary

Many studies have compared the effects of full day kindergarten to those of half day kindergarten on a number of dimensions. In this review of the existing research, project staff analyzed the research on several categories of student outcomes. On the issue of attendance, findings are inconclusive. The studies involving academic achievement, including grade retention and special education referrals, generally support the effectiveness of full day over half day programs. However, the magnitude of this positive effect varies considerably from study to study, with many researchers reporting large effects, many others reporting small effects, and a minority reporting negligible effects. Findings on social and behavioral effects are mostly in favor of full day programs. Disadvantaged students in full day kindergarten were also found to experience greater academic benefits than students in half day programs, although the magnitude of these greater benefits is again variable. The national research suggests that there are no negative outcomes commonly associated with full day kindergarten.

Section II: Data from Indiana Districts on Full Day Kindergarten Effects

Researchers have conducted several evaluations of full day kindergarten in Indiana. These studies followed students in the following Indiana school districts: Evansville-Vanderburgh School Corporation, Lawrence Township, Perry Township, Muncie Community Schools, and Indianapolis Public Schools. Each set of studies is reviewed in this section. The Evansville study is by far the most exhaustive and, consequently, is discussed in the most detail. Data were also collected from and analyzed from two additional Indiana districts: a large, urban district and a rural district. Table 2 summarized the results of the Indiana studies.

Several criteria were used to identify research for this section of the report: First, data had to be available for full day kindergarten students *and* a control group of students (usually half day students in the same district or school). Second, full day programs needed to be every day programs, not full day –alternate day programs. Third, extended day programs could not be included unless substantive instruction occurred during the extended day part of the program (i.e., the program could not be half day kindergarten plus afternoon child care).

The Evansville-Vanderburgh Longitudinal Study

An extensive study comparing full day and half day kindergarten programs was conducted by the Evansville-Vanderburgh School Corporation. This longitudinal study began in 1978 with four schools initiating full day kindergarten programs in Evansville, Indiana. Matched comparisons were conducted with control groups from four district schools offering half day programs. The first cohort of students attended kindergarten in the 1978-79 school year, with a second cohort following in 1979-80. Matching was based on SES backgrounds at the school-level with a participant-level random sample populating the control group of half day kindergarten students. The purpose of this study was to examine possible long-term benefits of full day kindergarten participation. Data collected consisted of standardized tests such as the Boehm Test of Basic Concepts and the California Achievement Tests; report cards; school records; teacher, parent, and student questionnaires; and interviews.

Attendance

The Evansville researchers examined attendance patterns during the participants' kindergarten years and later during their middle school years. For kindergarteners in full and half day programs, researchers found absentee rates of 8.5% and 10.8% respectively. For participants followed through sixth, seventh, and eighth grade, the mean difference between days absent was not statistically significant.

Academic Achievement

Academic achievement was one of the most salient aspects of the Evansville-Vanderburgh study. Data addressing scholastic progress as well as early cognitive development were collected from scores on several tests, report card grades, and the Teacher Opinionnaire.

The Boehm Test of Basic Concepts was administered to the full day kindergarten group before and after the 1979-1980 school year in order to gauge academic achievement. Scores from the full day group were 15% higher than average mid-level socioeconomic norm. These results suggest that the full day kindergarten participants had greater academic progress throughout the year when compared with the norm. Additionally, the California Achievement Tests produced useful data for examining achievement differences between full day and half day kindergarteners. All but one of the subtest scores and the combined scores were significantly higher for full day kindergarteners.

In the spring of 1980 the Gates-MacGinitie Reading Tests were given to the 1978-1979 cohort. Results showed that full day students had better reading ability in first grade than did half day participants. This test was administered a second time two years later to both the 1978-1979 and 1979-1980 cohorts, and results showed that both full day groups had significantly higher ability in comprehension and vocabulary skills than did students in the half day programs.

Finally, the Comprehensive Test of Basic Skills was administered in the spring of 1982 when the 1978-1979 cohort was in third grade. Students who had attended full day kindergarten scored significantly higher than the half day participants in 10 of the 14 areas. This test was administered again when the students were in fifth grade, and a final time in seventh grade. Both fifth-grade and seventh-grade scores for the full day kindergarten group were higher than the half day group in all 14 areas.

The only instrument to favor the half day kindergarten programs was the Evaluation Scale—Cursive, a handwriting test that was administered to both the 1978-1979 and 1979-1980 cohorts in the fall of 1982. Results showed that the half day kindergarteners scored higher than full day students.

Data were also collected from report cards in the first, second, and third grade years for both cohorts. Over 23 comparisons, full day participants were found to have higher percentages of satisfactory marks and lower percentages of less-than-satisfactory marks than half day participants.

The Teacher Opinionnaire was given to all of the primary teachers involved in the study after the cohort students had finished primary school. When asked about student work habits, 60% of the teachers believed that full day kindergarten participants had better work habits than half day students. Sixty-four percent of teachers thought that students from the full day kindergarten group functioned more independently than the half day group. Further, the majority of teachers responded that former full day kindergarten participants had better-developed fine motor skills, gross motor coordination, and handwriting. Sixty-four percent of teachers also believed that students from the full day group were better at following directions. However, when asked about differences in academic ability, results were mixed as 38% of teachers agreed there were no apparent differences between groups but 38% believed there were.

Grade-Level Retention and Special Education Referrals

This study was also concerned with differences in grade retention and special education referrals between the full day and half day kindergarten groups. Grade retention rates for all students participating in the study were compared in the summer of 1982. Non-promotions due to special education placement were included in the totals.

Half day kindergarten students had more grade retentions than full day students in both the 1978-1979 and 1979-1980 cohorts. Nineteen percent of the former half day kindergarten students from the 1978-1979 group were not promoted to the next grade level at the end of either kindergarten, first, second, or third grade whereas only 9% of full day students were not promoted. The half day students in the 1979-1980 cohort also had a higher rate of grade retentions, with 17% of the half day students being retained and only 4% of the full day students being retained.

Comparisons of special education placements between the full day and half day kindergarten groups were also obtained, with results strongly favoring neither full nor half day programs. A greater percentage of students in the 1978-1979 full day group was placed in special education (6% compared to 2% of half day participants). These percentages were not statistically significant, however, and thus could be attributed to sample variation. The 1979-1980 group comparison showed that 4% of full day students and 3% of half day students had special education placements.

Social and Behavioral Effects

Mixed methods were used to assess possible differences in social and behavioral development in relation to kindergarten program type. Instrument and survey responses as well as conduct marks on report cards were examined.

The Survey of School Attitudes was distributed in 1982 when the 1978-1979 cohort was in third grade and the 1979-1980 cohort was in second grade. The findings of this survey are contradictory. Mean scores showed school attitudes among the 1978-1979 full day group to be higher than those of half day students in all 4 subject areas: math, reading, science, and social studies. In contrast, students in the 1979-1980 group who had attended half day kindergarten had higher scores than full day program participants. The overall results indicate no significant difference in school attitudes between students who were enrolled in half day kindergarten and those who attended full day programs.

The Teacher Opinionnaire was completed by the 25 primary school teachers in first through third grades who were involved with the study. The opinionnaire covered a broad range of questions comparing effects of full day versus half day kindergarten involvement. The results revealed that the majority of teachers believed full day kindergarten participation had beneficial socialization and behavioral outcomes. Forty-two percent of the teachers indicated that children who had been enrolled in full day kindergarten appeared to be better at socializing with peers than half day kindergarteners. Also, 52% of teachers believed the attention spans of students who had attended full day kindergarteners were longer than those of former half day kindergarten attendants.

The Piers-Harris Children's Self-Concept Scale was administered in 1982 when the 1978-1979 cohort was in third grade and the 1979-1980 cohort was in second grade. Test results

show that for both cohorts, students who had attended full day kindergarten had better self-concept scores than those who attended half day programs.

Conduct marks on student report cards were looked at for first, second, and third grade students in the 1978-1979 cohort, and the first and second grade report cards were used for the 1979-1980 group. Possible scores in the 12 conduct areas (such as "shows self-confidence", "works well with others", or "uses self-control") included Satisfactory Progress, Improvement Shown, or Needs Improvement. Results of a statistical test indicated that in first grade, the full day kindergarten group and half day group had an equal percentage of Satisfactory marks, but the full day group had a lower percentage of less-than-satisfactory marks. Reports from the second grade indicated that former full day kindergarten attendants had a greater percentage of Satisfactory marks and fewer less-than-satisfactory marks than the half day group. Remarks about the third graders who previously attended full day kindergarten were Satisfactory more often than those of the half day group. Results for the 1978-1979 cohort are given in Table 3. Overall, students who formerly attended full day programs had a higher percentage of Satisfactory conduct marks and received far fewer less-than-satisfactory marks than their half day counterparts.

Table 3. Second Grade Academic Marks for 1978-1979 Kindergarten Students

Subject	Group	N	<u>Satisfactory</u>		<u>Improvement Shown</u>		<u>Needs Improvement</u>		Chi-Square	p
			n	%	n	%	n	%		
Mathematics	Full day	76	69	91	3	4	4	5	26.84	< .01
	Half day	97	53	55	16	16	28	29		
Reading	Full day	76	67	88	4	5	5	7	16.76	< .01
	Half day	97	60	62	7	7	30	31		
Hand-writing	Full day	76	56	74	5	7	15	20	3.80	N.S.
	Half day	97	58	60	8	8	31	32		
Spelling	Full day	76	70	92	2	3	4	5	16.67	< .01
	Half day	97	64	66	12	12	21	22		

The results of the Survey of School Attitudes, the Teacher Opinionnaire, the Piers-Harris Children's Self-Concept Scale, and the report card conduct marks indicate that participation in full day kindergarten programs may lead to greater social and behavioral gains than half day participation. Although the Survey of School Attitudes showed no significant difference between experimental and control groups, the other three methods favored full day kindergarten.

Extracurricular Activities

Participation in extracurricular activities was also examined for the 1978-1979 cohort as they reached grades six, seven, and eight. Former full day kindergarten attendants had higher participation rates during sixth and eighth grades than former half day students in The Academic Academy, an after-school program offering various performance and scholastic activities. A comparison of the total athletic participation among the sixth, seventh, and eighth graders included in the study showed that the full day group had higher participation rates than the half day group. Additionally, students who had attended full day kindergarten had higher participation rates in other activities such as band, cheerleading, and student council during all three grades. Overall, extracurricular activity involvement was greater for students who had attended full day kindergarten.

Parent Responses

A Parent Questionnaire was mailed to all parents of kindergarteners involved in the study at the end of their kindergarten year. The questionnaire addressed parental concerns about learning and program preference as well as reasons for program selection. In response to the question of how much their children had learned in kindergarten, parents representing both full and half day students believed their children had learned a great deal (82%). Parents of full day students indicated that they felt their children experienced greater levels of cognitive, psychomotor, affective, and linguistic growth than did the parents of half day students. If given a choice, 92% of the 130 full day kindergarten parents who returned the questionnaire stated that they would choose full day over half day kindergarten. Fifty-two percent of the parents of half day students indicated that they would have chosen full day kindergarten. Free response comments from parents were varied, expressing support or criticism for both types of programs.

A second questionnaire was mailed to parents of the full day kindergarten group when the 1978-1979 cohort was in fourth grade and the 1979-1980 cohort was in third grade. Of the 92 respondents, 95% believed that their child learned more in full day kindergarten than he or she would have learned in a half day program. Ninety-five percent also indicated that their children were better prepared for first grade because of full day kindergarten. Further, these parents also favored full day kindergarten over half day programs with respect to gains in their child's self-control. Overall, full day kindergarten parents were happy with their child's full day kindergarten participation and highly favored full day programs over half day kindergarten.

Lawrence Township Study

Renbarger (2003) examined literacy gains of kindergarteners enrolled in three types of programs: full day, half day, and alternate-day. This study evaluated pre and post-test scores for Letter Identification and Concepts About Print (CAP). The main objective of this study was to determine whether or not program type was related to significant differential improvements in literacy achievement. The researcher sampled 1530 students enrolled in both the 2000-2001 and 2001-2002 school years who consisted of the following demographics: 58% Caucasian, 32% African American, 8% Latino, and 2% Asian. Twenty-seven percent of the sample qualified for free or reduced lunch. The study took place in a centralized kindergarten program consisting of 24 classrooms in a school district comprised of 16,000 students. Each classroom was designed specifically for kindergarten programs and each contained a literacy center.

Parents were offered the option of full day, half day or full day alternate day programs, with the full day program being only the second most popular selection, 250 students enrolled each year. Full day kindergarten participation cost \$70.00 per week versus the fee-free half and alternate-day programs. The most popular program among parents was the alternate-day program with 500 participants, with the least popular program being half day having an enrollment of 167 students. Transportation was provided to and from school for the alternate-day students, but midday transportation was not available for half day attendants.

Two measures of literacy were administered pre and post from the Observation Survey of Early Literacy Achievement: 1. Letter Identification, 2. Concepts about Print. Pre/post difference scores across the three classrooms were compared using the Brown-Forsythe test statistic. This test statistic is a complement to ANOVA used for unbalanced sample sizes. A statistically

significant difference at the $p < 0.05$ level was found to exist across classrooms when comparing the gain scores for both Letter Identification and Concepts about Print. A comparison of these differences is reported in Table 4 and Table 5.

Table 4. Pre/Post Gains for Letter Identification

Program Comparison	Corresponding Means	Significance*
Full day – Half day	14.09, 16.00	ns
Full day – Alternate-day	14.09, 13.71	ns
Half day – Alternate-day	16.00, 13.71	$p < 0.05$

*Test statistic based on Dunnett's C

Table 5. Pre/Post Gains for Concepts about Print

Program Comparison	Corresponding Means	Significance*
Full day – Half day	7.52, 7.01	ns
Full day – Alternate-day	7.52, 6.88	$p < 0.05$
Half day – Alternate-day	7.01, 6.88	ns

*Test statistic based on Dunnett's C

Renbarger's literacy study suggests that in finding significant differences between half and alternate-day kindergarten programs for Letter Identification, children may be disadvantaged in an alternate-day classroom with respect to frequency of rehearsal and exposure to concepts. Here, students with daily exposure to learning activities indeed measured higher gains. Regarding the significant difference between full and alternate-day programs with respect to concepts about print, Renbarger's work again suggests that frequency of exposure to curricular learning activities results in higher achievement gains.

Perry Township Study

Full day kindergarten in Perry Township is a part of the On Track Program, an initiative designed to improve education and academic success for at-risk children. After second grade, the On Track students enter the regular classroom, but it is hypothesized that by the end of the kindergarten year, the students should be "on track" developmentally regarding their behavior, motivation, and academics (Zielke, 2002).

On Track participants are chosen through a three-step process: 1) a parent/caregiver interview; 2) testing on a nationally normed kindergarten developmental and basic skills screen; and 3) three weeks of classroom observations. If all three measures yield results that are interpreted to show that a child was at-risk, he or she is invited to experience the benefits of the On Track Program (Zielke, 2002).

In order to determine if the On Track Program is successful in helping at-risk students to function within a nationally standardized range of behavior, a self-regulation, cognitive and behavior assessment instrument was administered in three consecutive years (Spring 2000, Spring 2001, and Spring 2002). In the spring of 2002, kindergarten teachers completed the Conners' Teacher Rating Scale-Revised: Long Version (CTRS-R:L) for each of the On Track students in the study as well as their matched non-at-risk controls (Zielke, 2002).

Eighty-three percent (83%) of the thirteen subtest scores for each On Track student were in the normal range, as defined by the CTRS-R:L, while 1.2% of the scores fell in the significant concern range. Although a greater number of the non-at-risk matched controls' scores were in the normal range (99.1%) and none were considered to be of significant concern, the On Track Program appears to be effective due to the large percentage of at-risk students functioning within age-appropriate limits after one year in the program (Zielke, 2002).

When individuals' scores were averaged to create 13 mean subtest scores for each group (the On Track students and the non-at-risk control group), both groups fell within the normal range of functioning. The control group had lower mean scores on the subtests, however, indicating better functioning, with the largest discrepancy between groups being on the "anxious/shy behavior" subtest. Each student was assigned an overall mean score on the CTRS-R:L, and these scores were compared for each matched pair. Sixteen of the nineteen On Track students fell within the normal functioning range, and eight of the subjects either met or surpassed their matched control's score, indicating the performance of an at-risk student at or above the level of a non-at-risk peer (Zielke, 2002).

Muncie Community Schools Study

Based on the positive reaction to a pilot program which offered full day kindergarten to a portion of Title I students, the Muncie Community Schools in 1996 decided to begin implementing full day kindergartens in all of their Title I schools. By 1998, the Extended Day

Kindergarten program was in place in all seven Title I schools and was providing additional quality time on task and attempting to level the playing field for at-risk students (VanFleet, 2002).

In 2002, the Director of Elementary Instruction for the Muncie Community Schools produced a report evaluating the status of the full day kindergarten programs (VanFleet, 2002). In preparation for this report, VanFleet met frequently with Title I principals and teachers and obtained TerraNova and ISTEP+ test data from 1997 through 2002. VanFleet analyzed the full day program's progress on the areas of standards, curricular uniformity, communication, and sustainability.

Test data included in the report were the within-schools comparison of the scores of each cohort as they progressed through grade levels as well as a comparison by school of the mean scores for each grade from years 1997 to 2001. In general, after an initial jump in scores between the kindergarten and first grade years, as the full day kindergarten students advanced farther in school, their total scores on the tests declined. VanFleet (2002) addresses this trend in the sustainability section of his report, and he suggests increased communication among teachers as the students pass from grade to grade. For the most part, from year to year each grade level's mean scores have increased. However, to truly be a standardized comparison, more information on the test scores, such as percentile rank, is needed to assess any actual improvement.

In addition to providing the test data, VanFleet also offers some recommendations for improvement of the Muncie full day kindergarten program. From his study, he observed that there is little standardization of curricular strategies or materials among schools or teachers within the same schools. As previously mentioned, VanFleet (2002) also writes of the importance of communication pertaining to teaching strategies and student progress among teachers at different grade levels. With these improvements, the full day Title I program can develop into an even more effective means of leveling the playing field for economically disadvantaged students.

Indianapolis Public Schools Study

In 1997, the Indianapolis Public Schools designed and implemented ten pilot full day kindergartens to test the impact of extended learning opportunities on students. The kindergartens were placed in high schools and elementary schools and were compared on a

measure of vocabulary (the Peabody Picture Vocabulary Test-Revised) to five general education half day classes and thirteen Title I full day classes. Results were convincingly supportive of the benefits of full day kindergarten, regardless of location, and the research team strongly recommended that the Indianapolis Public Schools fund full day programs (Tatum, 1998).

Four years later, the 2001-2002 Indianapolis Public Schools Kindergarten Programs Annual Report (Beatty, 2002) describes three different full day kindergarten programs: Title I Full Day Kindergarten, Magnet Full Day Kindergarten, and Full Day Lottery Kindergarten. Participation in the Title I programs is determined during the first week of school, and the children most at risk for academic failure are placed in this extended school day. There are 47 Title I Full Day programs in the district, each averaging a class size of 16. The twelve Magnet Full Day Kindergartens are populated through a lottery drawing, the traditional magnet process. The Full Day Lottery Kindergarten programs select their 230 students (23 per class) through a lottery as well and are located in elementary, middle, and high schools (Beatty, 2002).

In order to reach 100% student achievement by 2014, as outlined in the No Child Left Behind Act of 2001 (NCLB), the district has set short term goals that focus on building educational foundations in kindergarten. To assess the progress of the kindergarten programs toward reaching these goals, during the 2001-2002 school year students were given the Signposts Early Literacy Battery, an instrument which measures language arts and reading skills. Although designed to determine student achievement levels in relation to the NCLB standards, this assessment also yielded interesting results about the performance of students in full day kindergarten programs compared to those in half day programs (Beatty, 2002).

Excluded from this summary are the scores of Half Day Plus Daycare programs, as they made up only 6% of the sample. Full Day Lottery Kindergartens had the highest percentage (73%) of students scoring at or above the 50th percentile on the Signposts Early Literacy Battery, followed by Magnet Full Day Kindergartens (64%). The Title I programs had the least amount of achievement (50%), just behind Half Day programs at 53% (Beatty, 2002).

Magnet Full Day Kindergartens had the highest percentage of students at the advanced reading level (8%), while Full Day Lottery and Half Day Kindergartens tied at 3% and Title I Full Day Kindergartens had 2%. At the middle reading level, Full Day Lottery Kindergartens had the highest percentage of students (79%), while Half Day Kindergartens had 64% and Magnet Full Day Kindergartens had 63%. Title I Full Day Kindergartens had the lowest

percentage of students (60%) performing at the middle level. Conversely, the Title I programs had the highest percentage of students with low reading abilities (38%). Half Day programs had 33% of their students at the lowest reading level while Magnet and Lottery Full Day Kindergartens had 29% and 18%, respectively (Beatty, 2002).

Data comparing the 2001 to 2002 scores was not available for the Magnet Full Day Kindergartens, but the Title I and Lottery Full Day Kindergartens showed improvements on various measures. The Title I Full Day programs increased the percentage of students scoring at or above the 50th percentile from 36% to 50%, and they decreased the percentage of students at the lowest reading level from 40% to 30%. Full Day Lottery Kindergartens also noticed an improvement in meeting the 50th percentile standard, from 61% of students in 2001 to 73% in 2002, and the percentage of students reading at the lowest level decreased from 25% to 18% (Beatty, 2002).

Overall, the full day programs are making progress toward the district's short-terms achievement goals. The Magnet and Lottery Full Day Kindergarten students are also outperforming the Half Day Kindergarten students, further evidence of the effectiveness of this type of education.

Analysis of Data from a Large, Urban School District

Detailed ISTEP+ data were obtained from a very large, urban school district in Indiana. After removing records with missing data, the sample size for the analyses was 1,886. All students were third graders during the 1998-1999 school year and attended either half or full day kindergarten in the same district. Pre-kindergarten measures of ability or achievement were not available, but full day kindergarten in this district was targeted solely in Title I schools during these years. The district implemented full day kindergarten, using a combination of Title I and district funds, primarily to lessen the achievement gap between students.

A multivariate analysis of variance was used to analyze student standardized scores on the ISTEP+, with mathematics and language arts standardized scores as dependent variables and program type (half or full day), free lunch status (pay for lunch or free/reduced lunch), and race (black and Hispanic or white) as independent variables. Results provide evidence that the differences between full and half day students are negligible, and the interactions between program type, student race, and lunch status also lack significance (Table 6). However, although

differences related to the three-way interaction are very small, we noticed an interesting pattern among the data (Figures 1-4).

Table 6. Multivariate Analysis of Variance of ISTEP Language Arts and Mathematics Scores

Source of Variance	Wilks' Lambda	df ₁	df ₂	Multivariate F	p	η^2
Race	.936	2	1839	62.72	< .001	.064
Lunch	.963	2	1839	34.95	< .001	.037
Program Type	.997	2	1839	2.77	.06	.003
Race x Program	.999	2	1839	.57	.56	.001
Lunch x Program	1.000	2	1839	.43	.65	.000
Race x Lunch x Program	.997	2	1839	2.36	.10	.003

Figure 1. ISTEP+ Language Arts Scale Scores for Black and Hispanic Students by Lunch Status

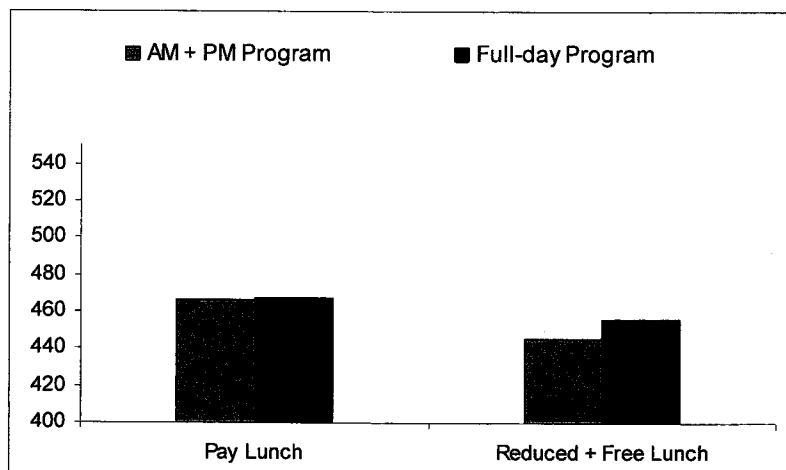


Figure 2. ISTEP+ Language Arts Scale Scores for White Students by Lunch Status

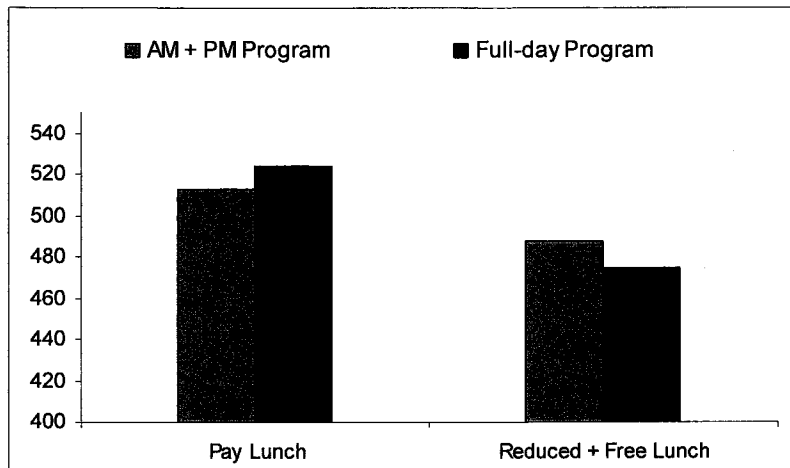


Figure 3. ISTEP+ Mathematics Scale Scores for Black and Hispanic Students by Lunch Status

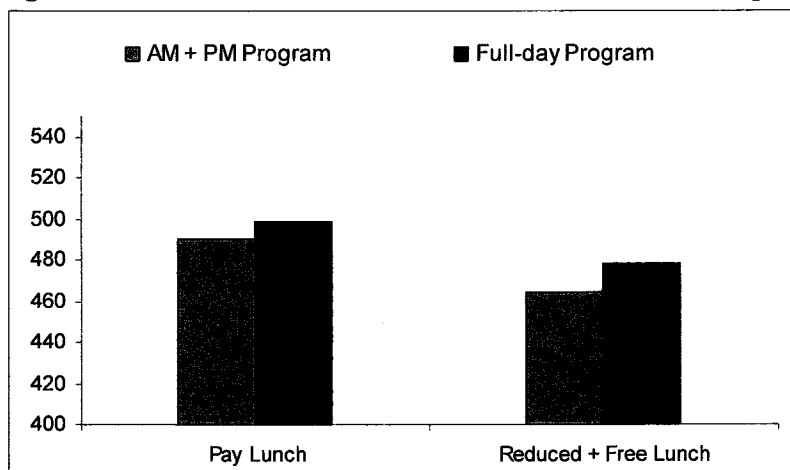
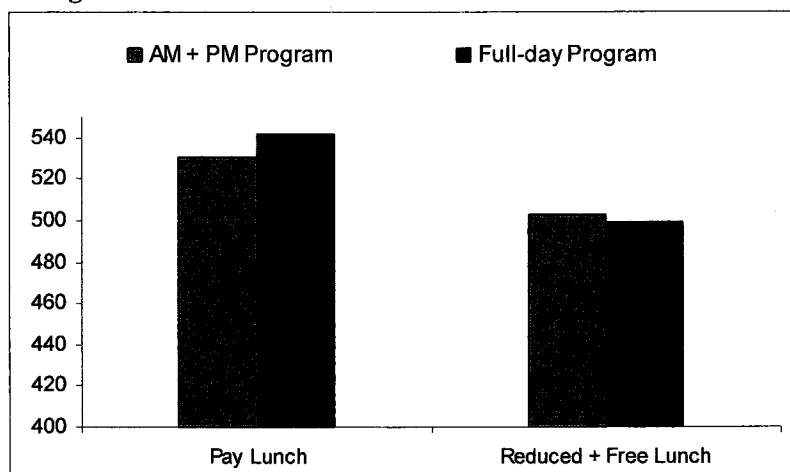


Figure 4. ISTEP+ Mathematics Scale Scores for White Students by Lunch Status



Interpretation of these results is difficult in the absence of pre-kindergarten ability and achievement data, but the results suggest that the district's goal for implementing full day kindergarten – shrink achievement gaps between high performing, middle class, white students and low performing, poorer, racial minority students – may have been achieved (i.e., full day students, who presumably started at a lower level than most half day students, perform as well as half day students by third grade, and minority students and non-reduced/free lunch students appear to benefit from full day programs more than other students). However, the district still has a problem with economically disadvantaged and minority students performing significantly lower than other students, although the effect size estimate provides evidence that the difference is small.

Analysis of Data from a School in a Rural District

A concern among educators is the degree to which kindergarten instruction should be led by certified teachers (i.e., Can aides run extended day programs, therefore saving money?). Project staff obtained data from a rural Indiana district to investigate this issue. The final sample was 162 students, 70 of whom attended half day kindergarten with an extended day program in 1999-2000 and took the 2002 ISTEP in third grade, 92 of whom attended a full day program in 2000-2001 and took the 2003 ISTEP in third grade.⁴ Chi square tests of statistical significance were used to analyze the pass rates on language arts and mathematics subtests with Cramer's V calculated as an effect size estimate. District personnel were not aware of any other instructional or structural changes in those schools that would account for any differences between the 2002 and 2003 cohorts.

Two sets of analyses were conducted, with all students included in the first set and all students with the exception of students receiving special education services included in the second set. For all students, statistically significant differences do not appear to exist between the two cohorts on ISTEP+ language arts scores ($\chi^2 (2) = 2.60, p = .27, V = .13$), but small to moderate differences were found on mathematics scores ($\chi^2 (2) = 9.72, p = .008, V = .25$). These results suggest that students who experienced full day kindergarten passed the ISTEP+ mathematics exams at higher rates than half day/extended day students (70% vs. 89%,

⁴ The extended day program was taught by an aide and was not coordinated with teachers in the half day kindergarten program.

respectively). Language arts passing rates were not significantly different (71% full day vs. 77% half day). Results were similar when students receiving special education services were removed from the sample. These results provide evidence that students who participated in full day kindergarten were more likely than half day/extended day students to pass the mathematics portion of the ISTEP+ exam in third grade.

Summary

Results from the eight Indiana data sets reflect the results of the national research on full versus half day kindergarten. As was the case with the national data, the Indiana research suggests that there are no negative outcomes commonly associated with full day kindergarten, and that – at worst – full day kindergarten and half day kindergarten have similar effects. Significant results in support of the benefits of full day over half day kindergarten were found in many of the comparisons within these studies. When analyzed on the major dimensions of academic achievement, retention and special education referrals and social and behavioral effects, the benefits of full day kindergarten programs are apparent.

Section III: Analysis of Daily Activities in Full Versus Half Day Kindergarten Programs

As Center staff conducted the research reported in the first two sections of this report, one specific criticism of full day kindergarten emerged as an unexamined issue. To many critics, full day programs have the potential to be nothing more than half day kindergarten with an extra half day of play time. We identified only two recent studies that provide detailed analyses of how time is spent in full and half day programs: one national study and one study of students in Wisconsin.

Given this paucity of research, we conducted a two phase study of instructional activities in Indiana kindergarten classrooms: In phase one, we collected full and half day kindergarten schedules from Indiana schools and compared the scheduled activities. In phase two, we conducted several site visits to full day programs to establish the validity of submitted schedules. In this section of the report, we review the two published studies, describe the analysis of Indiana kindergarten schedules, and summarize the results of the site visits. We conclude this section with a brief summary.

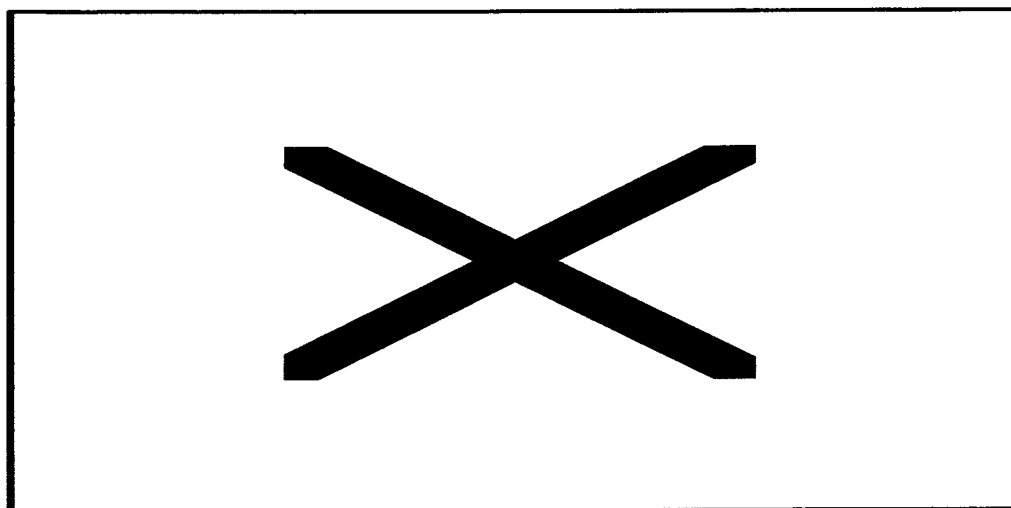
Published Studies on How Time is Spent in Full and Half Day Classrooms

Research from the 1970s and early 1980s suggested that extending half day programs to a full school day would have little positive effect if the extra time was used merely as childcare or babysitting (Harding & Safer, 1988). These same authors conclude that research from that period suggests that full day kindergarten time should be spent "providing a variety of education activities related to the ... needs of kindergarten children," that these activities should be developmentally appropriate, and time should be set aside for both structured and unstructured play (p. 61).

Elicker and Mathur (1997) conducted a comprehensive, multi-year evaluation of full and half day programs in an unidentified community in Wisconsin. They found that students in full day classrooms spent significantly more time in small-group teaching, one-on-one teacher-student interactions, and self-initiated learning activities. These self-initiated activities, which accounted for approximately 85 minutes per day, included play. Although full day students also spent more time in large-group teaching contexts, the percentage of time spent in these activities was considerably less than that experienced by half day students.

Denton et al. (2003) report the results of a recent survey of classroom activities from the Early Childhood Longitudinal Study. The data, which were teacher-reported, indicated that percents of time spent on various instructional approaches was similar across program types. However, results regarding play time were not reported (Figure 5).

Figure 5. Average Percent of Class Time that Public Kindergarten Classes Used Various Instructional Approaches, Spring 1999



Note. Data from Denton et al. (2003).

At the same time, ECLS data provide evidence that full day programs are more likely than half day programs to use mixed-level grouping, achievement level grouping, and peer tutoring. In addition, full day programs were more likely than half day programs to spend time on certain skills each day, including “letter recognition, letter-sound match, conventions of print, vocabulary, making predictions based on text, using context clues for comprehension, rhyming words, reading aloud, reading multi-syllable words, and alphabetizing” (p. 12).

Curriculum/Schedule Analyses

With the assistance of the Indiana Association of Public School Superintendents, each public school district in the state was asked to submit typical daily schedules for their full and half day programs. Extended day or alternate day-full day programs were not included in the

analysis. After removing those schedules from the data, schedules from 131 program types were received: If a district provided more than one half or full day schedule, all schedules of similar program type were averaged together. Data from nine schools were excluded from the analyses due to missing data.

Minutes per day were calculated for each of the following categories: language arts, including English, writing, reading, and related activities; mathematics; other instruction; and structured play time. Averages and standard deviations for each category of activity are included in Table 5. T-tests were conducted to determine whether the differences between program types were statistically significant, and Cohen's *d* was calculated as an effect size estimate. As was expected, full day kindergarten schedules included much more total instructional time than half day schedules ($t = 23.52$, $p < .01$, $d = 3.99$): Full day mean = 284.10 minutes (SD = 43.75), half day mean = 141.47 minutes (SD = 21.38). When extrapolated to a 180-day school year, this represents an additional 428 hours of instruction per year. Assuming a six hour school day, 428 hours represents roughly 71 additional days of instruction.⁵ When analyzed by category (Table 7), full day kindergarten schedules included significantly more minutes for each type of activity than half day schedules.

Table 7. Statistical Test for Difference of Spending Time (minutes) between Half Day and Full Day Kindergarten^a

	Mean(SD)		<i>t</i>	<i>p</i>	Effect Size ^a
	Half day	Full day			
LA	55.00(28.64)	107.45(44.71)	7.75	<.001	1.35
Math	22.64(8.54)	35.21(15.05)	5.33	<.001	.96
Other Instruction	71.48(32.24)	143.59(45.88)	10.06	<.001	1.78
Play	16.88(8.03)	35.10(17.71)	6.95	<.001	1.21

^a *N* = 120

Note. Cohen's *d* was used for the effect size. Pooled estimate of the population's standard

deviation was calculated as follows; $\hat{\sigma}_{pooled} = \sqrt{\frac{(df_1 \cdot \hat{\sigma}_1^2) + (df_2 \cdot \hat{\sigma}_2^2)}{df_{total}}}$.

⁵ Assuming a five hour day, which is probably more reasonable given that 100% of six hours is not used for instruction, 428 hours represents nearly 86 additional days of instruction.

To determine the relative use of specific activities in each type of kindergarten program, schedules were reanalyzed to determine the length of the school day in minutes. After subtracting minutes devoted to lunch (but not recess), this total was used to determine the percent of time spent in each category of activity (Table 8). With respect to total instruction time, a slightly higher proportion of total time was devoted to instruction in half day classrooms ($t = 2.45$, $p = .02$, $d = .45$): Half day mean = 84.42% (SD = 10.65), full day mean = 78.50% (SD = 14.71). When analyzed by category (Table 8), the only significant difference was that mathematics instruction accounted for a higher proportion of instructional time in half day versus full day programs (note, however, that minutes of instruction in mathematics was higher in full day programs). Interestingly, the percent of time devoted to play was similar across both programs.

Table 8. Statistical Test for Difference of Portion of Spending Time (%) between Half Day and Full Day Kindergarten^a

	Mean(SD)		<i>t</i>	<i>p</i>	Effect Size
	Half day	Full day			
LA	33.06(17.48)	29.29(12.27)	1.37	.18	.26
Math	13.30(4.97)	9.40(3.96)	4.27	<.001	.90
Other Instruction	42.91(18.88)	40.38(17.43)	.75	.46	.14
Play	10.06(5.21)	9.80(5.97)	.21	.84	.04

^a $N = 122$

Site Visits

After collecting the schedule, Center staff became concerned that reported time may be different from how time is actually spent in kindergarten classrooms. To investigate this issue, staff conducted site visits to 14 classrooms in six schools that had submitted full day kindergarten schedules. Schools were visited in urban, suburban, and rural districts spread across Indiana. Observations lasted two to four hours and were conducted at various points throughout the school day, and most teachers were not given advanced notice of the exact timing of the

observations by the person organizing the visits at each school. At some schools, teachers and administrators were interviewed about full day kindergarten after the classroom observations.

Project staff observed instructional activities almost exclusively throughout the day, with the exception of recess time following lunch. Child-initiated activities, which were categorized by the published studies as play time, did not involve play in the observed schools. Rather, these activities were instructional or provided opportunities for review and application of material that was being covered that day in class. For example, in one classroom, students were given 10 minutes to write on a topic of their choosing after 10 minutes of teacher-directed writing instruction and practice. In several schools, child-initiated activities occurred through the use of learning centers: In one classroom, students rotated among nine independent learning centers for 45 minutes each morning, with the expectation that they will visit four centers per day. The centers included activities in the areas of poetry, reading, listening, puzzles, language arts, computers, mathematics, art, and writing.

Summary

The research literature and data collected for this report provide evidence that time in full day kindergarten programs is different both quantitatively and qualitatively from how time is used in half day programs. Across all of the schools in the Indiana sample, the proportion of instructional time is similar across program types, resulting in much greater instructional time in full day programs, representing approximately 40-50% more instruction in full day programs than half day programs. The Wisconsin study and the Indiana site visits suggest that in individual classrooms, the additional time leads to greater use of child-initiated activities. In the site visit schools, these activities were almost universally instructional in nature and did not involve play. The published research also provides convincing evidence that certain types of reading skills and grouping strategies are more prevalent in full day programs, including reading aloud, peer tutoring, and mixed-ability grouping. During the Indiana site visits, researchers saw evidence of these activities, but half day programs were not observed and therefore comparisons cannot be made.

Conclusions and Recommendations

1. Both the Indiana and national data collected and analyzed for this report provide evidence that, relative to half day programs, full day kindergarten is associated with a wide range of positive outcomes, including increased student achievement and social and behavioral development.
 - In both our site visits and several of the published studies, teachers reported that the full day format allowed time to address state standards more effectively and address the diverse learning needs of students of differing abilities. This effect cannot be assessed for a few years, but the impact on ISTEP+ scores could be substantial if teacher perceptions are accurate.
 - Any state-funded full day kindergarten program should include an evaluation component to promote accountability. Although evaluation is critical to the success of any educational program, evaluation is especially important in situations where programs should result in significant new expenditures and new savings – a system should be put in place to ensure that savings related to, for example, reduced special education referrals are being realized.
2. The positive outcomes associated with full day kindergarten appear to be larger for disadvantaged students in both the national and Indiana research.
 - Full day kindergarten appears to be effective in reducing achievement gaps. If funding for universal full day kindergarten is not available in the current economic climate, funding could be focused on providing full day kindergarten to schools with low achieving subgroups of students. National research suggests that minority students and students of lower socioeconomic means are more likely to benefit from full day programs if the class size is fewer than 25 and an aide is available in the classroom.
3. Full day kindergarten, regardless of its organization and funding mechanism, is expensive relative to half day programs. Costs include additional teachers, instructional aides, and classroom space (Harding, 1988; Rothenberg, 1984). In Indiana, the most widely cited current estimate for the costs of a full day kindergarten initiative is roughly \$110 million.

- Schools, both nationally and in Indiana, use a range of strategies to pay for full day kindergarten programs. The most common sources of funding are the state general fund, existing Title I funds, and parent fees (often calculated on a sliding scale relative to family income).
 - Savings resulting from full day kindergarten are difficult to determine. Substantial savings should be realized over the long-term due to reduced special education referrals and the need for less remediation, reduced need for midday transportation and crossing guards, and reduced need for half day childcare programs. However, childcare costs will not be entirely eliminated (Elicker, 2000), as many families may still rely on childcare both before and after students attend full day programs each day.
 - A number of existing “full day” programs may actually be extended day programs, which are often staffed with aides. Any anticipated savings based on the existence of current programs may prove to be smaller than anticipated.
 - Alternate day full day programs are appealing due to the potential for reduced costs, but this type of program is generally not associated with positive outcomes relative to every day full day or every day half day programs.
4. The literature contains many comments about the importance of quality versus quantity of kindergarten experience (i.e., it’s not full day, it’s what happens in full day that counts). Although this perspective is valid, it oversimplifies the research on instructional activities in full day classes. A better perspective is that the added time in a full day program fundamentally changes the nature of activities that occur in that program. Not only do teachers tend to do more in full day programs, they tend to do more of the instructional strategies that researchers recommend to promote young children’s learning.
- Although a few studies suggest that small class sizes are more effective than full day kindergarten in raising student achievement, other studies provide evidence that full day classes of moderate size (e.g., fewer than 25 students) are optimal. Indeed, Walston et al. (2002) found evidence that full day kindergarten does not necessarily mitigate the negative effects of large class sizes on student achievement.

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Appendix A: Summary of Select Kindergarten Policies for All 50 States⁶

State	District Offering of Kindergarten	Student Attendance in Kindergarten	District Offering of Full day Kindergarten	Student Attendance in FDK	If FDK is mandatory, must districts also offer HDK?
Alabama	M*	P	M	P	Not specified
Alaska	P	P	P	P	N/A
Arizona	M	P	P	P	N/A
Arkansas	M	M	M	P	Not specified
California	M	P	P ⁷	P	N/A
Connecticut	M	M	P	P	N/A
Delaware	M	M	P	P	N/A
Florida	M	P	P	P	N/A
Georgia	M	P	M	P	Not specified
Hawaii	M	P	P	P	N/A
Idaho	P	P	P	P	N/A
Illinois	M	P	P	P	Yes
Indiana	M	P	P	P	N/A
Iowa	M	P	P	P	N/A
Kansas	M	P	P	P	N/A
Kentucky	M	P	P	P	N/A
Louisiana	M	M	M	M	No
Maine	M	P	P	P	N/A
Maryland	M	M	M	P	Not specified
Massachusetts	M	P	P	P	N/A
Michigan	P	P	P	P	N/A
Minnesota	M	P	P	P	N/A
Mississippi	M	P	M	P	Not specified
Missouri	M	P	P	P	N/A
Montana	M	P	P	P	N/A
Nebraska	M	P	P	P	N/A
Nevada	M	M	P	P	N/A
New Hampshire	P	P	P	P	N/A
New Jersey	P	P	P	P	Not specified
New Mexico	M	M	P	P	Not specified
New York	P	P	P	P	N/A
North Carolina	M	P	M	P	No
North Dakota	P	P	P	P	N/A
Ohio	M	M	P	P	Yes
Oklahoma	M	M	P ⁸	P	Not specified
Oregon	M	P	P	P	N/A
Pennsylvania	P	P	P	P	N/A
Rhode Island	M	M	P	P	N/A
South Carolina	M	M	M	P	Yes
South Dakota	P	P	P	P	N/A
Tennessee	M	M	P	P	N/A
Texas	M	P	P	P	N/A
Utah	M	P	P	P	N/A
Vermont	M	P	P	P	N/A
Virginia	M	M	P	P	N/A
Washington	M	P	P	P	N/A
West Virginia	M	M	M	M	No
Wisconsin	M	P	P	P	N/A
Wyoming	M	P	P	P	N/A

*M=Mandatory, P=Permissive

⁶ Source data retrieved January 2, 2004, from <http://mb2.ecs.org/reports/Report.aspx?id=8>.

⁷ Limited to Early Primary Program students.

⁸ Oklahoma has since required districts to offer full day kindergarten programs.